

PYCNOGONIDA OF THE WESTERN PACIFIC ISLANDS II. GUAM AND THE PALAU ISLANDS

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Abstract.—Nine species of Pycnogonida are reported from the western Pacific islands of Guam, Saipan, and the Palau Islands. These are: *Ammothella tippula*, new species, and *Anoplodactylus chamorrus*, new species, both from Guam; *Achelia nana* (Loman) from Saipan; and *Achelia* sp., *Ammothella elegantula* Stock, *Tanystylum rehderi* Child, *Anoplodactylus pycnosoma* (Helfer), *Anoplodactylus* sp., *Callipallene novaezealandiae* (Thomson), *Seguapallene micronesica*, new species, and *Austrodecus palauense*, new species, from the Palau Islands. No particular distributional patterns can be discerned because of the scarcity of records from islands of the western Pacific.

This is the second report in a series on the virtually unknown pycnogonids of the Western Pacific islands. In it are described two new species, *Ammothella tippula* and *Anoplodactylus chamorrus*, from Guam in the Marianas, and six species, two of which are new; *Seguapallene micronesica*, and *Austrodecus palauense*, plus at least three species identified only to genus for lack of appropriate material, from the Palau Islands in the western Carolines. A single record from Saipan Island in the Marianas is included here to complete the records for all specimens known to me.

There are no pycnogonid records to my knowledge from the Marianas and only two records from the Caroline Islands, both from Stock's (1968:10, 49) report on the collections made by the *Galathea* and the *Anton Bruun*. One records Hilton's *Ammothella pacifica* from Ifaluk Atoll, and the other is a record of *Anoplodactylus digitatus* (Böhm) from Koror, Palau Islands. Neither species was found among the specimens reported herein. Little microfaunal sampling has been done in Micronesia, Polynesia, or Melanesia, and it is safe to say that many new species of the small littoral and shallow-water genera remain to be discovered among these hundreds of islands and atolls.

Few distributional patterns are worthy of note, mainly due to the scarcity of collecting records for pycnogonids throughout the islands of the entire Pacific basin. The majority of known species reported herein have been collected at other Pacific island localities or at least from several Indo-Pacific localities. *Achelia nana* (Loman) has been recorded in Indonesia in addition to the Philippines and Japan. *Ammothella elegantula* Stock is known from the Straits of Malacca and *Tanystylum rehderi* was recorded from the Society Islands. *Anoplodactylus pycnosoma* (Helfer) has been recorded from Japan to Madagascar and from a number of intermediate localities, while *Callipallene novaezealandiae* (Thomson) has recently been noted at Enewetak Atoll, Marshall Islands (Child 1982:277), and was known previously from New Zealand, Australia, and off East Africa.

The new species have their closest affinities with related species of the Pacific basin, as would be expected. *Ammothella tippula* is closest to *A. pacifica* Hilton,

noted above from Ifaluk, Caroline Islands, along with other Indo-Pacific distribution. *Anoplodactylus chamorrus* is closest to two other compact species; *A. derjugini* Losina-Losinsky, from the Sea of Japan, and *A. compactus* Hilton, a species from the California coast and islands. *Seguapallene micronesica* has no close distributional relations as the genus is known only from one other species in the subantarctic Îles Crozet of the Indian Ocean. *Austrodecus* is a predominantly Subantarctic and Antarctic genus, but with a proposed "corridor" of species carrying north from New Zealand and the Kermadec Islands to Japan. The closest morphological relation to *A. palauense*, new species, is *A. elegans* Stock, a species known only from the subantarctic Prince Edward Islands. It is less closely related to its New Zealand, Kermadec, and Japanese congeners. There is therefore no particular pattern to the distribution of the species in this report except perhaps a reinforcement to the congeneric corridor theory for *Austrodecus*.

The specimens in this report originated from the George Vanderbilt Foundation (Stanford University, California) Expedition to the Palau Islands, sponsored by the U.S. Office of Naval Research (G.V.F.), a short survey trip to Guam and Palau by J. L. Barnard and the author, and from the Bernice P. Bishop Museum (BPBM), Honolulu, Hawaii. All specimens except the Bishop specimen are deposited in the U.S. National Museum of Natural History under the catalog numbers of the old U.S. National Museum (USNM).

Family Ammotheidae
Achelia nana (Loman)

Ammothea nana Loman, 1908:60–61, pl. 1, figs. 1–13.

Achelia nana.—Stock, 1953a:300–301, fig. 14; 1954:97; 1965:14–15, figs. 1–3; 1968:16; 1974:13–14.—Utinomi, 1971:329–330.

Material examined.—Saipan, from test block immersed in sea 90 days, 24 Feb 1950, 1 ♂ (BPBM).

Remarks.—There is little difference between this specimen and published figures of males. There is a hint of a segmentation line between the first and second trunk segments, but none between the second and third. The sixth oviger segment has the strong recurved spine mentioned by Stock (1965:15).

This specimen extends the distribution slightly to the east from the known Indo-West-Pacific habitats of *Achelia nana*.

Achelia, species indeterminate

Material examined.—Palau, SE Koror Island, Iwayama Bay, E side of mouth of Raki-Swido (Oyster Pass), from sponge in 2 to 15 ft. (0.6–4.6 m), 7°18'57"N, 134°30'09"E, 22 Oct 1955, G. V. F. sta 220A, 1 juvenile. Palau, Koror Island, sea reef inside cove next to cave at SE end of Island, wash of 4 kinds of sponges in 0.1 m, 2 Jul 1974, J. L. Barnard, 1 ♀.

Remarks.—The juvenile specimen has some characters of *Achelia assimilis* (Haswell), but this variable species demands an adult with a full set of characters for assignment. The female from the cave cove is possibly a new species. The trunk is semi-triangular in dorsal aspect and has no tubercles except at the anterolateral corners of the cephalic segment. The first coxae have 2 small laterodistal

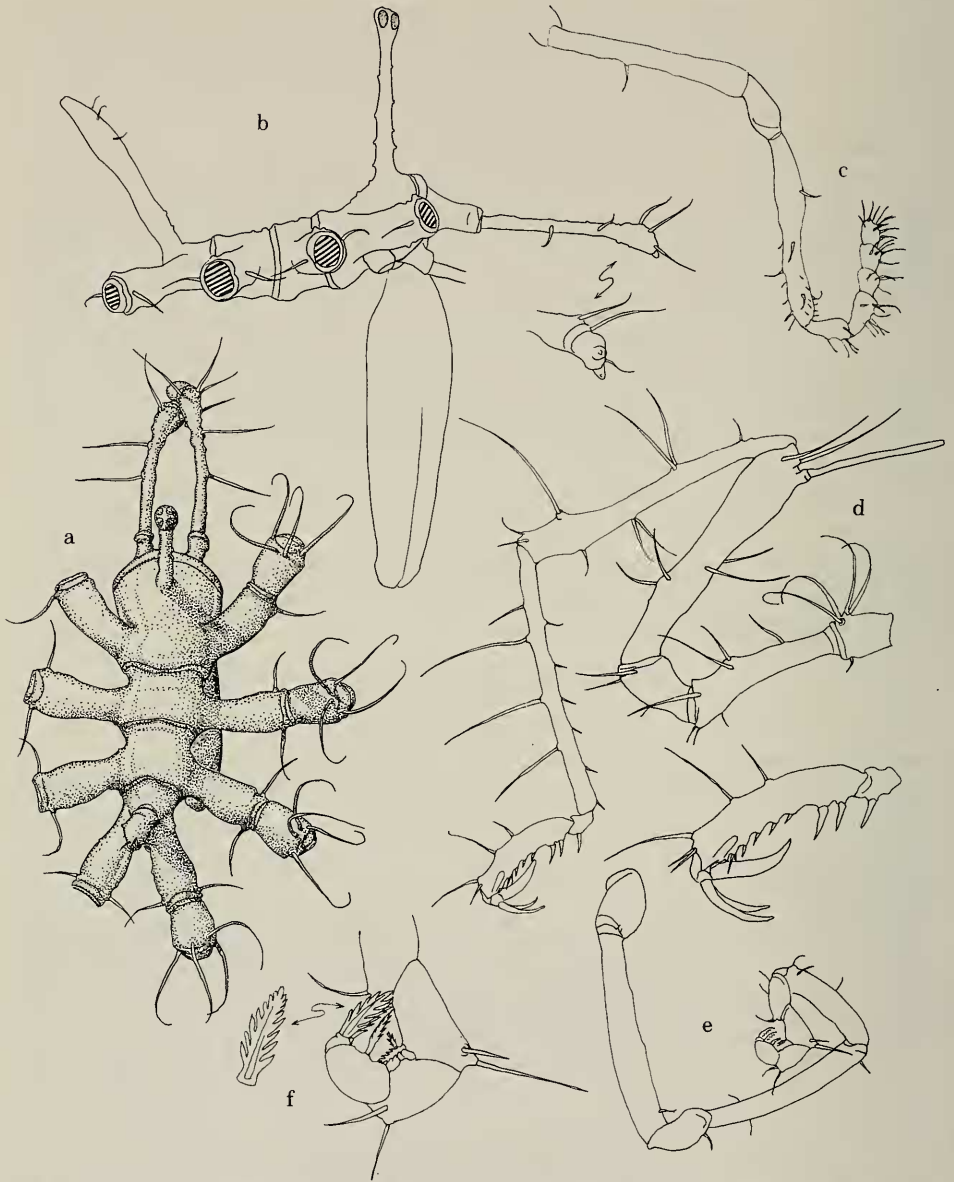


Fig. 1. *Ammothella elegantula*, male: a, Trunk, dorsal view; b, Trunk, lateral view, with distal chelifore enlargement; c, Palp; d, Third leg, with distal segments enlargement; e, Oviger; f, Strigilis, with terminal denticulate spine enlarged.

tubercles, but the trunk and appendages are otherwise without tubercles. The distal 4 palp segments are almost circular in outline and the second segment is only twice as long as its diameter. Without a male, I refrain from naming this specimen rather than add another name to this confusing group of extremely variable species.

Ammothella elegantula Stock

Fig. 1

Ammothella elegantula Stock, 1968:11–12, fig. 2a–c.

Material examined.—Palau, Koror Island, sea reef inside cove next to cave at SE end of island, wash of 4 kinds of sponges in 0.1 meter, 2 Jul 1974, J. L. Barnard, 1 ♂, 2 larvae.

Remarks.—This very distinctive species is reported here only for the second time. It was described from a juvenile specimen taken in the Straits of Malacca in 77 meters. The present material fortunately includes a male from which the adult characters may be described.

The chelae, as in all adults of *Ammothella*, are reduced to rounded knobs having 2 short stubs as fingers. The ocular tubercle does not have the 2 posterior tubercles of the type-specimen, but has many tiny low papillae over most of its surface. The abdomen does not have any of the long setae or tubular spines common to species of this genus, but has a few short distal setae. The setae of the lateral processes and first coxae are distinctive. They are longer than the segment diameter and occur distally on the posterior of the first lateral processes and on the anterior and posterior of the remaining 6 lateral processes. Those of the first coxae are longer, fully twice the segment diameter or slightly longer, and are 4 in number, placed dorsodistally.

In the adult, palp segments 2 and 4 are subequal and are the longest segments. Segments 5 and 6 are twice as long as wide and subequal in length, and the terminal 3 segments are small, only slightly longer than wide.

The male oviger is typical of *Ammothella*; second segment longest, fourth segment slightly shorter, fifth about two-thirds the length of the fourth, the seventh with a slight distal apophysis bearing 2 long setae ectally and 1 denticulate spine endally, eighth and ninth with 1 denticulate spine each, and tenth a tiny segment bearing 2 larger denticulate spines having 5 to 8 marginal serrations.

The leg is long and very slender, as described, and has a few very long setae per segment, some 4 or 5 times longer than the segment diameter. The femur and first tibia are swollen distally, or club-shaped, while the second tibia is cylindrical. The cement gland appears as a dorsodistal tube over twice as long as the femur diameter. The terminal leg segments agree very much with those of the juvenile with 2 heel spines and a similar tarsus spine. The second tibia is slightly shorter than the first in the adult and the femur is slightly shorter than either tibia. Most other measurements differ only slightly from the juvenile holotype.

The capture of this species in Palau extends its distribution well out into the Western Pacific islands from the Straits of Malacca, and its depth range is extended from 77 meters to the littoral.

Ammothella tippula, new species

Fig. 2

Material examined.—Guam, Anae Island, just E in deep channel, wash of coralline and other algae from 11 m, 13°21'25"N, 144°38'20"E, C. A. Child, 27 Jun 1974, 1 ♂ holotype (USNM 195374), 1 ♀, 1 juvenile paratypes (USNM 195375).

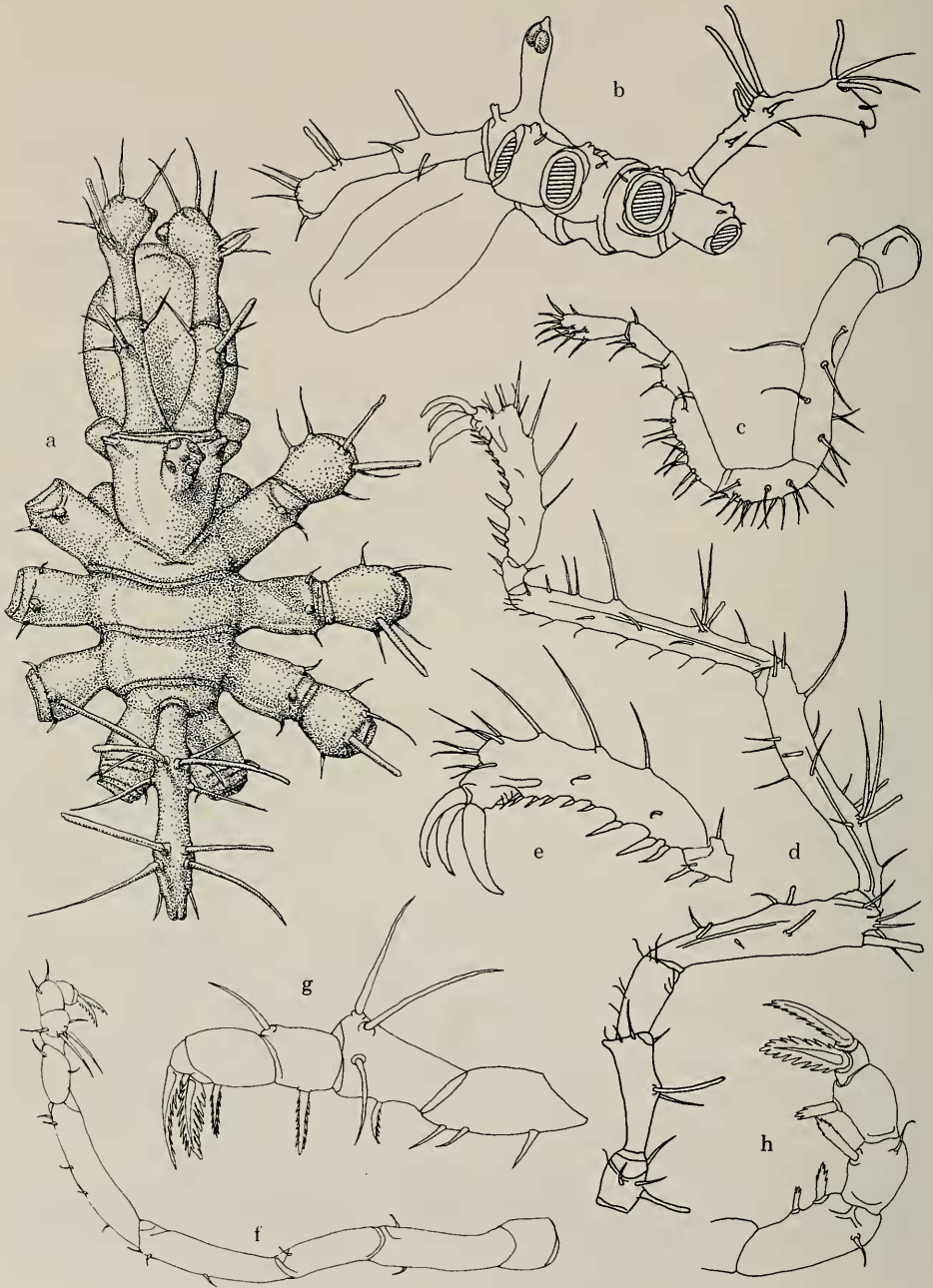


Fig. 2. *Ammothella tippula*, holotype male: a, Trunk, dorsal view; b, Trunk, lateral view; c, Palp, distal 7 segments; d, Third leg; e, Terminal segments of third leg enlarged; f, Oviger; g, Strigilis. Female: h, Strigilis.

Description.—Very small, holotype leg span slightly more than 5 mm. Trunk broad, robust, fully segmented, without median tubercles or spines, armed with 2 small slender anterolateral tubercles on ocular segment. Lateral processes 1.5 times longer than wide, separated by half their diameters or less, armed with tiny low dorsodistal tubercles bearing papillae and short distal setae on posterior and anterior of all lateral processes except first where anterior setae are missing. Ocular tubercle tall, over 3 times taller than maximum diameter, swollen at apex with large darkly pigmented eyes, capped with tiny papilla. Abdomen a long posterior-curing cylinder with median and distal swellings armed with 2 groups of very long tubular spines and 2 very long distal setae, 2 short median setae and 2 short laterodistal setae.

Proboscis ovoid, massive, with broad flat lips having ventral cleft just distal to marked constriction.

Chelifores 3-segmented, robust, almost as long as proboscis, second segment only slightly longer than first. First segment armed with long dorsal tubular spine and 3 lateral and distal setae. Second segment armed with long dorsal tubular spine, 1 long seta of equal length just proximal to spine, and 5 long dorsodistal and laterodistal setae, each longer than segment diameter. Chela small, ovoid, vestigial, with crease for movable finger.

Palp 9-segmented, slender, segments 3 to 9 increasingly setose distally. Segment 2 little longer than segment 4, both armed with several lateral and ventrodial setae longer than segment diameter; segments 5 and 6 subequal, over 3 times longer than their diameter; segment 7 shortest, less than twice longer than its diameter; segment 8 twice its diameter in length; terminal segment slightly less than 3 times longer. Most setae longer than segment diameter.

Oviger 10-segmented, segments 2 and 4 subequal, segment 5 slightly longer. Seventh segment swollen distally with apophysis bearing 3 long setae. Seventh, eighth and ninth segments armed with single denticulate spine each, bearing many marginal denticulations. Terminal segment tiny, wider than long, armed with 2 denticulate spines larger than preceding ones.

Third leg: first coxa armed with 2 long tubular spines on first pair of legs, 1 similar spine on posterior 6 legs, 2 dorsodistal long setae and 1 lateral short seta on anterior and posterior of all first coxae. Coxa 2 with dorsal bulge bearing 1 long tubular spine and 1 long seta, several setae distally. Coxa 3 with several ventral and ventrodial setae. Femur shorter than tibiae, armed with 4 lateral long tubular spines and 2 long lateral setae, ventrally with 2 short setae, and distally with 4 or 5 long setae. Cement gland tube dorsodistal, longer than segment diameter, inserted on low tubercle. Tibia 2 slightly longer than tibia 1, both armed with 2 dorsal long tubular spines, 2 long setae proximally and 1 long seta distally measuring more than 3 times segment diameter, several short lateral setae and 2 or 3 tubular spines, and several short ventral setae. Tarsus tiny, armed with 1 dorsal, 2 lateral, and 1 ventral setae and 1 ventrodial spine. Propodus moderately slender, well curved, without heel but with 3 large heel spines and 5 or 6 small sole spines, dorsally armed with several setae longer than segment diameter and few short distal setae. Claw moderately long, slightly curved with well curved auxiliaries only slightly shorter than main claw.

Female (paratype) at least 25 percent larger in all measurements except oviger

which is smaller than that of male. Oviger segment lengths similar to male but strigilis without seventh segment apophysis and setae. Denticulate spines arranged 2:1:1:2 from seventh to tenth segments. Fewer tubular spines on most appendages.

Measurements of holotype (in mm).—Trunk length (chelifore insertion of tip 4th lateral processes), 0.51; trunk width (across 2nd lateral processes), 0.46; proboscis (laterally), 0.39; abdomen (laterally), 0.38; 3rd leg: coxa 1, 0.13; coxa 2, 0.23; coxa 3, 0.16; femur, 0.44; tibia 1, 0.48; tibia 2, 0.51; tarsus, 0.07; propodus, 0.27; claw, 0.11.

Distribution.—Known only from the type-locality, Anae Island, Guam, in 11 m.

Etymology.—The species name is Latin and refers to a water spider. It is sometimes spelled *tipula*.

Remarks.—There are a number of *Ammothella* species which share many characters with *A. tippula*, all of which appear to form a discrete species group within the genus: the *appendiculata* group. The Pacific members of this group are *A. appendiculata* (Dohrn), *A. indica* Stock, *A. pacifica* Hilton, *A. schmitti* Child, *A. dawsoni* Child and Hedgpeth, *A. spinifera* Cole, *A. symbius* Child, *A. setacea* (Helfer), and *A. elegantula* Stock. These species are all characterized by having a more or less slender appearance, long abdomen, slender legs bearing long setae and sometimes long spines, long chelifores with long setae or spines, fairly long ocular tubercle, and typical terminal leg segments with long claws. Most of these species bear some form of tubular, clubbed, or spatulate spines on the appendages, and it is often the presence or absence of these "special" spines that distinguishes a particular species. In relating these species to *A. tippula*, *A. elegantula* (reported on elsewhere in this report) is probably the most distantly related due to its lack of tubular spines, its very long slender proboscis, chelifores and ocular tubercle, and other dissimilar arrangements of setae and spines. The very long ocular tubercle and slender proboscis also disqualify *A. setacea* as a close relation. In addition, *A. setacea* has very long tubular spines on the cephalic segment and lateral processes, unlike *A. tippula*.

The remaining species all have a long curved abdomen bearing long setae, and most also have the long abdominal tubular spines as in *A. tippula*, but *A. appendiculata*, *A. indica*, and *A. symbius* have first scape segments much shorter than the second, unlike *A. tippula*, and have other characters such as spine arrangement which disagree with those of the new species. *Ammothella spinifera* has middorsal tubular spines on the trunk (in most but not all specimens) and tall slender lateral process tubercles unlike *A. tippula*. *Ammothella dawsoni* has many more spines on the chelifores and has many bristled or plumose spines on the appendages which are not found on *A. tippula*, while *A. schmitti* has similar plumose spines in a different arrangement, a short ocular tubercle and more robust propodus with shorter claws.

The closest relation to *A. tippula* is *A. pacifica*, another Pacific island species. The new species differs from *A. pacifica* in having small tubercles at the anterolateral corners of the ocular tubercle, tiny low lateral process tubercles, three heel spines instead of four, an ocular tubercle placed well posterior to the rim of the ocular segment instead of adjacent to the rim, and a generally more robust appearance. The size of these two species offers further contrast. The leg span of an adult male of *A. pacifica* is 8.24 mm, while that of *A. tippula* is only 5.26 mm.

Ammothella pacifica is known from several localities in the Indo-West Pacific, including the Caroline Islands at Ifaluk Atoll, and is very close to the new species in spination and the segment lengths of its appendages.

Tanystylum rehderi Child

Tanystylum rehderi Child, 1970:302–306, fig. 5.

Material examined.—Palau, 8 mi NW of Koror, on inner margin of barrier reef, 7°24'30"N, 134°21'18"E, from octocoral *Clavularia* sp., with sand and coral in 1–2 m, 19 Jul 1955, G.V.F. sta 25-865, 2 ♂ with eggs, 1 ♀, 1 juvenile.

Remarks.—These specimens differ little from the type-specimens, 2 males from Bora Bora and Moorea, Society Islands. The ocular tip tubercle is a larger cone in the Palau specimens. Most of the other tubercles and segment lengths agree with the types.

The female was unknown until this Palau record. The lateral process and the first coxa tubercles are reduced in the female and those of the first coxa anterior are not bifurcate as in the male. The female oviger is typical of the genus and has spines which are only distally denticulate on the terminal 3 segments in the ratio 1:1:2.

This species is related to *Tanystylum acuminatum*, as discussed by Child (1970: 305), but the shape of the proboscis is quite different in *T. rehderi*, being a low-shouldered, long-necked bottle shape, while in *T. acuminatum*, the proboscis is like a broad oval flask having a narrow and shorter neck.

The Palau specimens extend the distribution of *T. rehderi* from the Society Islands westward to the western Caroline Islands and increase its depth range to 2 meters from the intertidal of the type-specimens.

Family Phoxichilidiidae

Anoplodactylus chamorrus, new species

Fig. 3

Material examined.—Guam, Ana'e Island, just E in deep channel, wash of coralline and other algae from 11 m, 13°21'25"N, 144°38'20"E, C. A. Child, 27 Jun 1974, 1 ♂ holotype (USNM 195376).

Description.—Very small, leg span slightly less than 4.5 mm. Trunk unsegmented, robust, broadly oval in dorsal aspect. Lateral processes touching proximally, slightly separated distally, little longer than their diameters, each armed with single low, broad, dorsodistal tubercle, glabrous. Ocular tubercle short, cylindrical proximally, a rounded cone distally, with large darkly-pigmented eyes at tubercle midlength. Neck short, narrow, glabrous. Abdomen erect, cylindrical, tapering distally to rounded point, armed with 2 posterolateral short setae.

Proboscis ovoid with slight proximal constriction, tapering distally to flat lips.

Palps represented by tiny buds on anterior of first lateral processes.

Chelifores robust, overhanging proboscis, scape armed with several short lateral and distal setae. Chela palm longer than fingers, oval, armed with 3 or 4 endal and ectal setae. Fingers short, well curved, without teeth, armed with 2 or 3 short setae ectally on movable finger.

Oviger moderately long, first segment broad, distal half with anterior expansion,

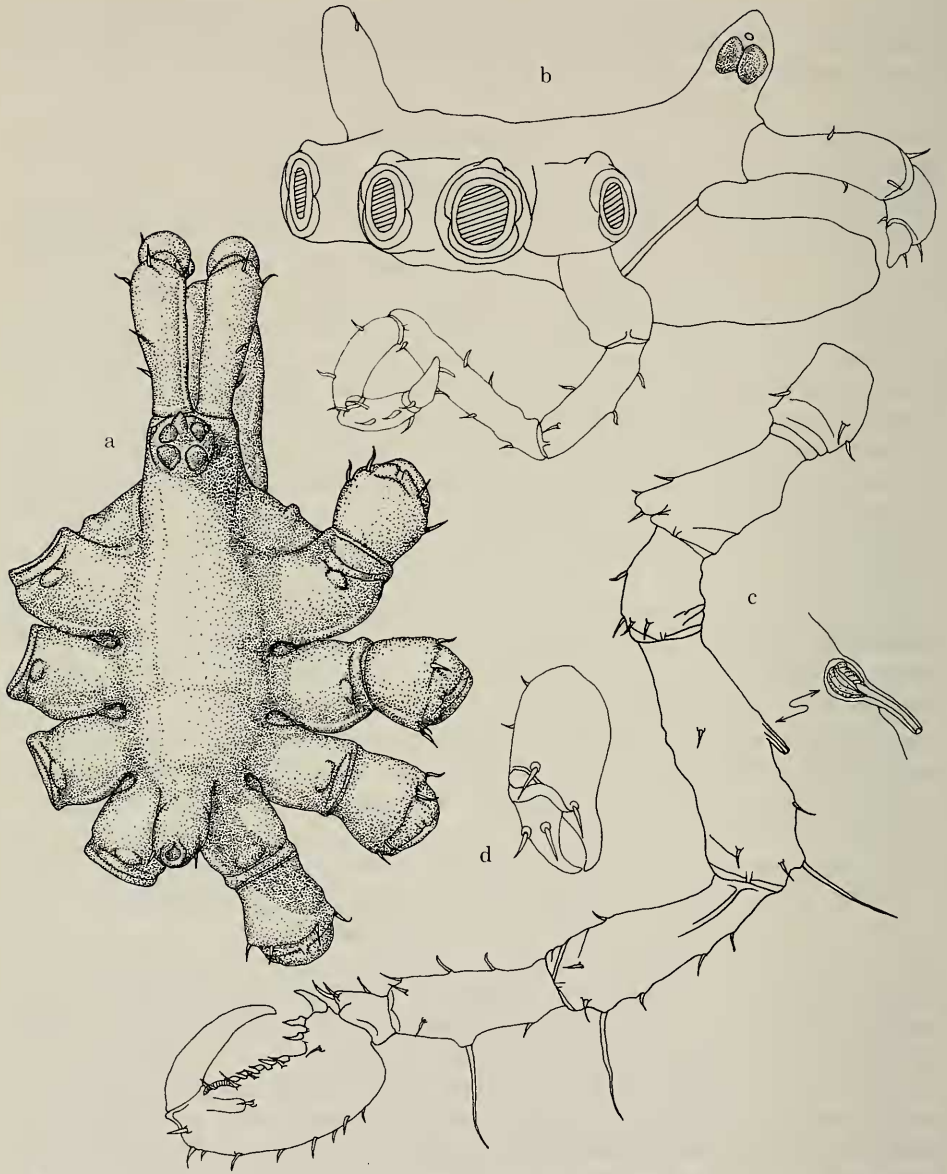


Fig. 3. *Anoplodactylus chamorrus*, holotype male: a, Trunk, dorsal view; b, Trunk, lateral view, with oviger attached; c, Third leg, with cement gland enlarged; d, Chelifore.

third segment longest, about 1.2 times as long as second segment, both second and third armed with several short setae. Strigilis with few setae; fourth with 2 or 3 ectal setae, fifth with 6 or 7 recurved short setae, terminal segment a curved cone with 3 or 4 short setae.

Leg moderately short, robust, armed with 1 dorsodistal seta almost twice as long as segment diameter of each major segment, few short setae on all segments. Femur longest segment, single cement gland a small oval terminating in slender

distally-pointing tube about 0.3 as long as segment diameter. Second coxa with small ventral sexual spur not extending beyond distal end of segment, terminating in tiny sex pore. Tarsus semi-rectangular, without long ventrodistal extension, armed with 2 ventral setae. Propodus robust, with marked heel bearing 1 heel spine and 2 smaller spines, sole straight, armed with 5 curved spines, several tiny setae and small propodal lamina only 0.25 as long as sole. Claw massive, moderately curved, auxiliaries absent.

Measurements of holotype (in mm).—Trunk length (chelifore insertion to tip 4th lateral processes) 0.6; trunk width (across 1st lateral processes), 0.45; proboscis (lateral), 0.38; abdomen (lateral), 0.15; third leg: coxa 1, 0.12; coxa 2, 0.28; coxa 3, 0.13; femur, 0.35; tibia 1, 0.3; tibia 2, 0.22; tarsus, 0.08; propodus, 0.29; claw, 0.19.

Distribution.—Known only from the type-locality, Ana'e Island, Guam, in 11 meters.

Etymology. Named for the ancient settlers of Guam and the Mariana Islands, the Chamorros, whose friendliness is immediately evident to modern travellers in these islands.

Remarks.—This tiny species resembles several other *Anoplodactylus* species having crowded lateral processes, short neck, and short robust legs. These are; *A. anarthrus* Loman, *A. aragaoi* Sawaya, *A. arescus* d-B. R. Marcus, *A. compactus* (Hilton), *A. derjugini* Losina-Losinsky, *A. haswelli* (Flynn), *A. marcusii* Mello Leitao, *A. minusculus* Clark, *A. tarsalis* Stock, and *A. viridintestinalis* (Cole), several of which were described in the now junior synonym *Halosoma*.

The new species is perhaps least related to *A. minusculus*, which has extremely short oviger segments, a long propodal lamina, and large chela fingers with teeth. The presence or absence of chela teeth is not always a good diagnostic character. Sometimes with a good series of one species, some specimens may not have chela teeth while others will have them. *Anoplodactylus haswelli* has three heel spines, no propodal lamina, a triangular-shaped trunk, auxiliary claws and chela finger teeth, while *A. aragaoi* has slightly separated lateral processes, longer appendage segments, a longer neck, and a longer cement gland tube. This new species is unlike *A. tarsalis* and *A. arescus*, both of which have a projecting tarsus of a long triangular-shape and differing leg segment lengths.

Anoplodactylus chamorrus is more closely related to *A. anarthrus*, except that the proboscis of the latter is smaller and of a different shape, the ocular tubercle is a more rectangular shape, and the cement gland is placed more proximally on the femur. The propodus of *A. viridintestinalis* has a lamina over the full sole and has longer appendage segments than *A. chamorrus*. The figures of *A. marcusii* (Mello Leitão, 1949:167–173, figs. 1–4) are inconclusive in detail, but they show a smaller proboscis, shorter leg segments, and different oviger segment lengths than those of *A. chamorrus*.

The new species appears to be closest to *A. derjugini* and *A. compactus*. The differences are that these two species have a non-tubular cement gland, full propodal lamina, auxiliary claws, and in *A. compactus*, larger lateral process tubercles, and with *A. derjugini*, a differently shaped chela with longer fingers, different ocular tubercle length, two heel spines, and many more setae on the terminal oviger segment. The combination of characters in *A. chamorrus* are thus unlike those of any known species.

Anoplodactylus pycnosoma (Helfer)

Peritrachia pycnosoma Helfer, 1938:176–177, fig. 7.

Halosoma pycnosoma.—Marcus 1940:45–46.

Anoplodactylus pycnosoma.—Stock 1953:41, fig. 5; 1954:75–77, fig. 33; 1974:16; 1975:132.—Utinomi 1971:326.—Child 1975:20.

Material examined.—Palau, Ngaremediu District, Urukthapel Island, fringing coral reef around first rock cape W of sand beach, 7°15'18"N, 134°26'48"E, on red algae in 0–2 m, 31 Jul 1955, G.V.F. sta 53-980, 1 ♀. Palau, Urukthapel Island, small bay at E end of N shore, around remains of stone pier, 7°15'57"N, 134°26'55"E, in 0.6–1.3 m, 2 Nov 1955, G.V.F. sta 258, 1 ♀.

Remarks.—These two females differ only slightly from the published figures for this species. The lateral processes of the Palau specimens are further apart and the propodus is slightly longer, but the specimens agree in other characters including the brown lines at the trunk segmentation and lateral process-first coxa segmentation.

The Palau Islands are added to the Indo-West Pacific distribution for this species. It is apparently confined to littoral depths.

Anoplodactylus, species indeterminate

Material examined.—Palau, SE Koror Island, Iwayama Bay, E side of mouth of Raki-Swido (Oyster Pass), on sponge in 2–15 ft (0.6–4.6 m), 22 Oct 1955, G.V.F. sta 220A, 7°18'57"N, 134°30'09"E, 1 larva. Palau, SE Koror Island, sea reef inside cove next to cave, 7°18'34"N, 134°30'35"E, wash of 4 kinds of sponges in 0.1 m, J. L. Barnard, 2 Jul 1974, 3 larvae.

Remarks.—There are at least two species represented in the three larvae collected by Barnard, but none of these specimens is of sufficient age to be determined.

Family Callipallenidae

Callipallene novaezealandiae (Thomson)

Pallene novae-zealandiae Thomson, 1884:246–247, pl. 14, figs. 1–4.

Callipallene sp. cf. *C. novaezealandiae*.—Child 1982:277 [literature].

Material examined.—Palau, unnamed islet between Amoi and Eil Malk islands, 7°11'35"N, 134°23'00"E, from hydroid-ascidian-sponge complex in 2 m, C. A. Child, 30 Jun 1974, 2 ♂ with eggs, 1 ♀, 6 juveniles. Palau, SE Koror Island, sea reef inside cove next to cave, 7°18'34"N, 134°30'35"E, wash of 4 kinds of sponges in 0.1 m, 2 Jul 1974, J. L. Barnard, 1 ♀.

Remarks.—These specimens agree in all respects with those reported (Child 1982:277) from Enewetak Atoll. One of the males has more strigilis denticulate spines than the Enewetak specimens, which decreases the gap of differences between these specimens and Thomson's original description of the species. I therefore propose to assign both the Enewetak and the Palau specimens to Thomson's species.

The Enewetak and Palau records extend the previously known distribution of this species from east Africa, Australia and New Zealand, to the northern hemisphere in Micronesia.

Seguapallene Pushkin, 1975

This genus was designated (Pushkin 1975:1404–1405, fig. 2) to contain a species of pycnogonid from the subantarctic Îles Crozet: *Seguapallene insignatus* Pushkin. This species is without palps, has well developed 2-segmented chelifores with regular teeth on the fingers, auxiliary claws, and an oviger with strigilis claw. The principal difference between this species and the new one described herein is teeth on the strigilis claw in the latter, lacking in Pushkin's species.

Seguapallene micronesica, new species

Fig. 4

Material examined.—Palau, SE Koror Island, sea reef inside cove next to cave, 7°18'34"N, 134°30'35"E, wash of 4 kinds of sponges in 0.1 m, 2 Jul 1974, J. L. Barnard, 1 ♂ holotype (USNM 195379), 3 ♀, 2 juveniles, paratypes (USNM 195380).

Description.—Moderately small, male leg span less than 9 mm. Trunk fully segmented, stout, without median tubercles, glabrous. Lateral processes short, not longer than wide, separated by half their diameter or less, glabrous. Neck short, only as long as width of oviger bases. Ocular tubercle implanted over oviger bases, short, rounded, only as tall as basal diameter, with tiny posteromedian bump and small lateral "horn" tubercles slightly longer than their basal widths. Eyes large, darkly pigmented. Abdomen moderately short, not extending beyond first coxae tips of fourth pair of legs, cylindrical anteriorly, tapering posteriorly, armed with pair of posterolateral setae.

Proboscis short, ovoid, tapering to small flat lips, without fringe of oral setae.

Chelifore 2-segmented, scape as long as proboscis, armed with 2 short ectal setae, 2 midlateral setae longer than segment diameter and 2 or 3 dorsodistal setae as long as segment diameter. Chela palm shorter than fingers, armed with several long dorsal and lateral setae. Fingers straight, curved only at tips, armed with short broad teeth, 11 on immovable finger and 10 on movable finger.

Oviger fourth and fifth segments long, fourth 7 times longer than its diameter, fifth over 8 times its diameter, armed with several ectal setae slightly longer than segment diameter. Fifth segment with distal apophysis shorter than segment diameter, armed with distal seta. Four strigilis segments cylindrical, each segment shorter than preceding, armed with denticulate spines having 4 lobes on each margin, arranged in the formula 5:5:4:5, well curved terminal claw bearing 5 large teeth.

Third leg; first coxa armed with anterodistal seta as long as coxa diameter, coxa 2 with 4 lateral setae longer than segment diameter, coxa 3 with several shorter ventral and ventrodistal setae. Femur and tibiae with several long lateral setae and from 1 to 4 longer dorsal setae, longer than twice segment diameter. Cement glands a series of tiny ventral pores along most of femur length. Tibia 2 longest segment. Tarsus quadrilateral, short, armed with 2 ventral setae longer than tarsus diameter. Propodus slender, moderately curved, without heel or heel spines, armed with 5 or 6 sole setae as long as segment diameter and several dorsal and distal setae, dorsodistal 2 over twice propodus diameter. Main claw short, not as long as segment diameter, well curved. Auxiliary claws more than twice main claw length, strongly curved.

Female (paratype) slightly larger in all measurements. Oviger segments 4 and

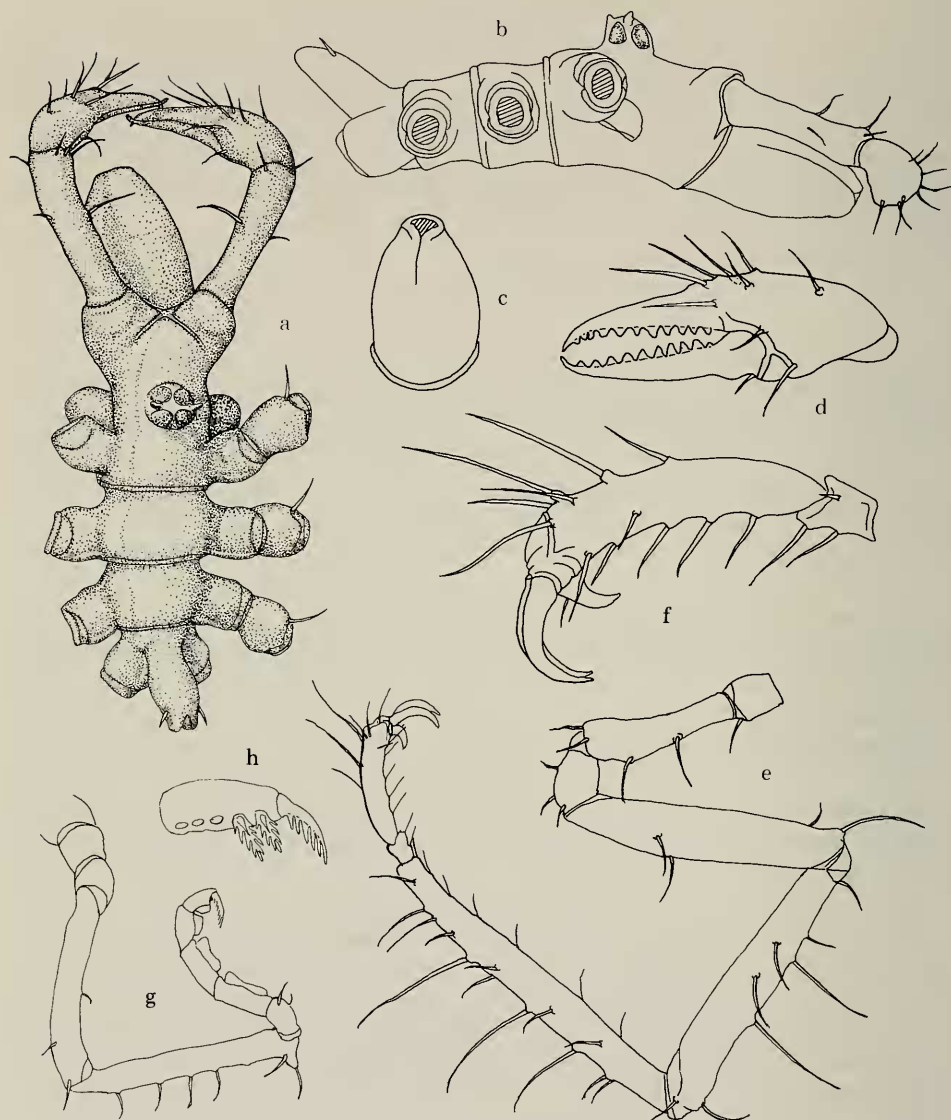


Fig. 4. *Seguapallene micronesica*, holotype male: a, Trunk, dorsal view; b, Trunk, lateral view; c, Proboscis, ventral view; d, Chela; e, Third leg; f, Terminal segments of third leg enlarged; g, Oviger; h, Strigilis terminal segment enlarged.

5 shorter, length only 3 times diameter, apophysis absent, strigilis with fewer denticulate spines and only 3 teeth on terminal claw. Main claw of propodus slightly shorter than in male.

Measurements of holotype (in mm).—Trunk length (chelifore insertion to tip 4th lateral processes), 0.95; trunk width, 0.41; proboscis (lateral), 0.38; abdomen (lateral), 0.23; third leg, coxa 1, 0.23; coxa 2, 0.46; coxa 3, 0.2; femur, 0.83; tibia 1, 0.96; tibia 2, 1.02; tarsus, 0.09; propodus, 0.36; main claw, 0.07; auxiliary claws, 0.15.

Distribution.—Known only from the type-locality, Koror Island, Palau Islands, in the intertidal.

Etymology.—Named for Micronesia, of which Palau and the Caroline islands form a major part.

Remarks.—The only other known species in this genus, *Seguapallene insignatus* Pushkin (1975:1404–1405, fig. 2), is quite different from this new species. Pushkin's species has pointed tubercles on the lateral processes, a much longer abdomen, a major ventral spine on the tarsus and three major heel spines, a large normal-size claw with two smaller auxiliaries, and marked differences in the oviger. Pushkin (1975:fig. 2f, g) illustrates what appears to be a female oviger while labeling it that of a male. The fourth and fifth segments are much shorter than those of *S. micronesica* and lack the fifth segment apophysis. His figure "g" is of the oviger terminal segments and shows a smooth claw without teeth. The denticulate spines differ greatly from the new species in having two long proximal serrations and many short distal serrations per side, similar to those common to the genus *Callipallene*. The denticulate spines of *S. micronesica* are more like those of many of the ammotheids.

The discovery of *S. micronesica* gives the genus an extraordinary distribution pattern. *Seguapallene insignatus* was described from specimens found in the cold Îles Crozet of the Subantarctic in 3 to 30 meters. The new species, found in tropical Palau, shows that the genus is not confined to particular thermal habitats, but that it is perhaps only confined to littoral and sublittoral habitats. There is a somewhat similar distribution pattern in the genus *Austrodecus* (see following species). This genus has a predominantly Antarctic and Subantarctic distribution, but several species are known to occur from New Zealand and the tropical west Pacific to Japan.

Family Austrodecidae

Austrodecus palauense, new species

Fig. 5

Material examined.—Palau, SE Koror Island, sea reef inside cove next to cave, 7°18'34"N, 134°30'35"E, wash of 4 kinds of sponges in 0.1 m, 2 Jul 1974, J. L. Barnard, 1 ♀ juvenile holotype (USNM 195377), 1 juvenile paratype (USNM 195378).

Description.—Holotype very tiny, leg span only 2.05 mm. Trunk slender, elongate, completely segmented, with 4 slender median tubercles shorter than trunk diameter, anterior tubercle longest, those posterior increasingly shorter. Lateral processes separated by their diameters or slightly more, armed with tiny latero-distal tubercles on posterior of first pair, anterior and posterior of second and third pairs, and absent from last pair. Ocular tubercle an obliquely anterior-pointing tapered cone, placed at extreme anterior of neck, bulging distally with well pigmented small eyes, over 3 times longer than its maximum diameter, apex armed with 2 tiny lateral papillae. Proboscis typical of the genus, long, tubular with distal annulations. Abdomen a long cylinder tapering distally, extending to distal tip of second coxae of fourth pair of legs, armed with 2 small lateral subapical setae.

Palp 5-segmented, second segment longest, armed with few short setae. 1 longer

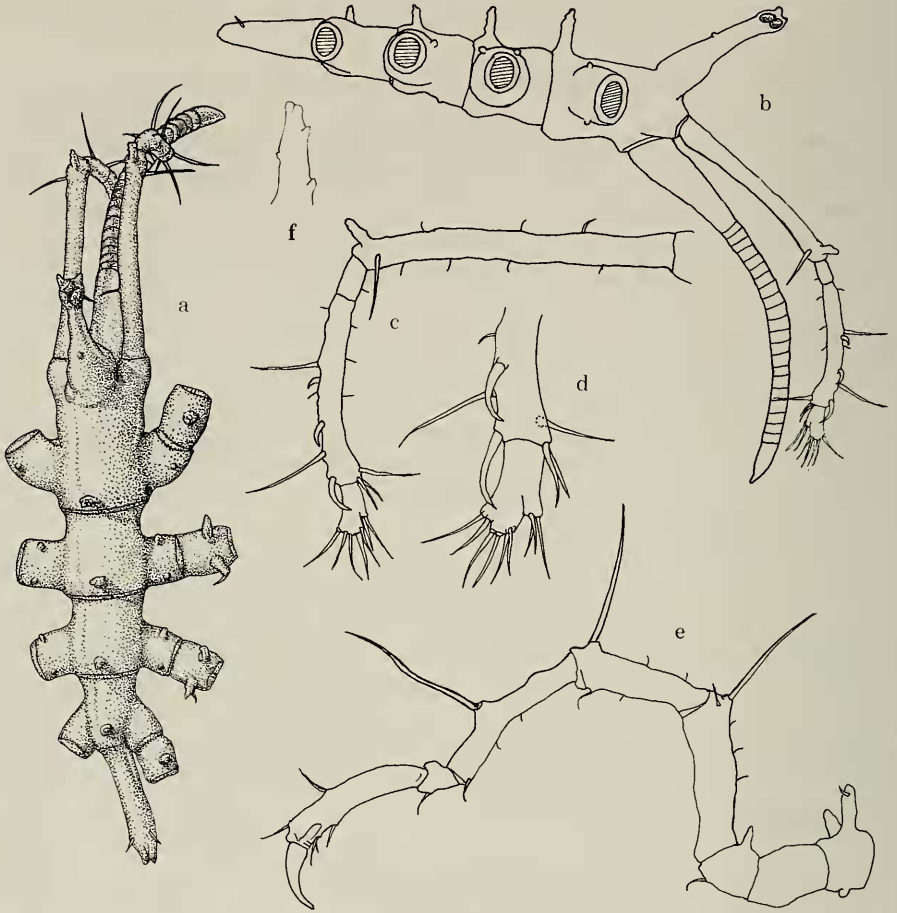


Fig. 5. *Austrodecus palauense*, holotype juvenile female; a, Trunk, dorsal view; b, Trunk, lateral view; c, Palp; d, Palp terminal segments enlarged; e, Third leg; f, Mid-dorsal tubercle of ocular segment enlarged.

ventrodistal seta and 1 slender dorsodistal tubercle not as long as segment diameter. Fourth segment curved, 0.6 as long as second, armed with several short setae, 3 long dorsal and ventral setae, and 3 stout curved spines dorsodistally. Fifth segment subrectangular with ventral tubercle giving appearance of slight bifurcation of segment, armed distally with dense setae longer than segment diameter.

Ovigers represented only by rudimentary buds ventrally on cephalic segment.

First coxae with dorsolateral tubercles slightly shorter than segment diameter, some with distal setae, arranged with 1 posteriorly on coxae of first pair of legs, 2 on second and third pair, and 1 anteriorly on fourth pair of legs. Third coxae with small dorsal tubercle not as long as segment diameter. Major leg segments armed with few short setae and single large dorsodistal setae longer than 3 times segment diameter. Propodus moderately curved, as long as femur, armed with 2 or 3 short sole setae, 2 dorsodistal setae and well curved claw slightly more than 0.3 propodus length. Sexual characters undeveloped.

Measurements of holotype (in mm).—Trunk length (palp insertion to tip 4th lateral processes), 0.59; trunk width (across 2nd lateral processes), 0.25; proboscis, 0.63; abdomen, 0.16; ocular tubercle, 0.22; 3rd leg, coxa 1, 0.05; coxa 2, 0.07; coxa 3, 0.06; femur, 0.16; tibia 1, 0.15; tibia 2, 0.17; tarsus, 0.03; propodus, 0.15; claw, 0.06.

Distribution.—Known only from Koror Island, Palau Islands, in 0.1 meter.

Etymology.—Named for the type-locality, the Palau Islands.

Remarks.—The discovery of this new species in a genus with predominantly Antarctic distribution tends to reinforce the theory that there is a western Pacific “corridor” of species from New Zealand to Japan, to account for the known temperate and tropical species development in this area. There is no known counterpart for this corridor along the eastern coast of South America or the east African coast. Several (at least five) species are known from New Zealand, two from the Kermadec Islands, the new species reported on herein from the Palau Islands, and the single known species from Japan all point toward this northern corridor. It may be possible, in future collecting, to discover other species in this corridor in the New Hebrides, Solomons, New Guinea, Marianas, and the Bonin Islands, as many species of *Austrodecus* appear to be endemic or at least are confined to restricted areas or corridors of distribution (see Stock 1957:figs. 7, 8, 12).

Austrodecus palauense appears closely related to *A. elegans*, a species from near the Subantarctic Prince Edward Islands. Both have well separated lateral processes, mid-dorsal trunk tubercles, slender laterodistal coxa 1 tubercles, and a very similar abdomen. The ocular tubercle of *A. elegans* is much longer and anterior-pointing, the leg segments are much longer, and it has auxiliary claws. How the new species will appear as an adult is conjecture, but it would already have developed auxiliary claws at this stage of growth if it were to have them. It is not likely that the lateral processes would be spaced closer together in the adult than in the juvenile (or sub-adult). In all other known species of *Austrodecus*, the lateral processes are more closely spaced than in *A. palauense*.

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Literature Cited

- Child, C. A. 1970. Pycnogonida of the Smithsonian-Bredin Pacific Expedition, 1957.—Proceedings of the Biological Society of Washington 83(27):287–308.
- . 1975. Pycnogonida of Western Australia.—Smithsonian Contributions to Zoology 190:1–28.
- . 1982. Pycnogonida of the Western Pacific Islands I. The Marshall Islands.—Proceedings of the Biological Society of Washington 95(2):270–281.
- Helfer, H. 1938. Einige neue Pantopoden aus der Sammlung des Zoologischen Museums in Berlin.—Sitzungsberichte Gesellschaft Naturforschungs Freunde (Berling) 1937:162–185.
- Loman, J. C. C. 1908. Die Pantopoden der Siboga-Expedition.—Siboga Expedition, Monographie 40: 1–88.
- Marcus, E. 1940. Os Pantopoda brasileiros e os demais Sul-Americanos.—Boletim Faculdade de Filosofia, Ciências e Letras da Universidade de São Paulo, series 19 (Zoologia) 4:3–179.

- Mello Leitão, A. de. 1949. Nova Espécie de *Halosoma* Cole, 1904 (Pantopoda, Phoxichilidiidae Sars, 1891).—*Anais da Academia Brasileira de Ciências* 21(2):167–173.
- Pushkin, A. F. 1975. [New Species of Callipallenidae (Pantopoda) from the Subantarctic.]—*Zoologicheskii Zhurnal* 54(9):1402–1406, 2 figures. [In Russian plus English Summary].
- Stock, J. H. 1953. Re-description of some of Helfer's pycnogonid type-specimens.—*Beaufortia* 4(35): 33–45.
- . 1953a. Contribution to the knowledge of the pycnogonid fauna of the East Indian Archipelago. *Biological Results of the Snellius Expedition* 17.—*Temminckia* 9:276–313.
- . 1954. Pycnogonida from Indo-West-Pacific, Australia, and New Zealand waters.—*Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening (Copenhagen)* 116:1–168.
- . 1957. The Pycnogonid family Austrodecidae.—*Beaufortia* 6(68):1–81.
- . 1965. Pycnogonida from the southwestern Indian Ocean.—*Beaufortia* 13(151):13–33.
- . 1968. Pycnogonida collected by the "Galathea" and "Anton Bruun" in the Indian and Pacific Oceans.—*Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening (Copenhagen)* 131:7–65.
- . 1974. Medio- and infralittoral Pycnogonida collected during the I. I. O. E. near Landbase on Nossi-Be, Madagascar.—*Bulletin of the Zoological Museum, University of Amsterdam* 4(3): 11–22.
- . 1975. Infralittoral Pycnogonida from Tanzania.—*Travaux du Muséum d'Histoire Naturelle "Gr. Antipa", Bucharest* 16:127–134.
- Thomson, G. M. 1884. On the New Zealand Pycnogonida with descriptions of new species.—*Transactions and Proceedings of the New Zealand Institute* 16(1883):242–248.
- Utinomi, H. 1971. Records of Pycnogonida from shallow waters of Japan.—*Publications of the Seto Marine Biological Laboratory* 18(5):317–347.

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